

microscopic bubbles, introduced by agitation and stabilized by the air-entraining agents in the paste phase of the mortar or concrete. It is known that the use of air-entraining agents increases freeze-thaw and scaling resistances of the air-entrained concrete, improves placeability, and reduces bleeding and segregation

5 of fresh concrete. The air-entrained concrete is more workable than non-entrained concrete.

The air-entraining agents are organic additives, and most commonly used are chemical surfactants which can be categorized into four groups: salts of

10 wood resins; synthetic detergents; salts of petroleum acids; and fatty and resinous acids and their salts. One of commonly used air-entraining agents in cement industry is an aqueous solution of neutralized hydroaromatic and fatty carboxylic acids, commercially available under the trade name of Airalon® from Grace Construction Products, Cambridge, MA 02140. It is known that Airalon®

15 generates stable air, has low addition rates, and it is easy and safe to handle. The dosage rate of Airalon® depends on the fineness and the air content requirement of each cement, and it is in general in a range from 0.03% to 0.35%.

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German patent No. xxx-(to-xx) discloses a machinable, nailable, and

20 screwable wood-based concrete. The concrete consists of Portland cement, concrete sand, and wood chips in a volume ratio of 1:1:4. To produce this concrete, coarse wood chips is soaked in water for 48 hrs, then mixed with cement and concrete sand to form the wood concrete. Although the prior art